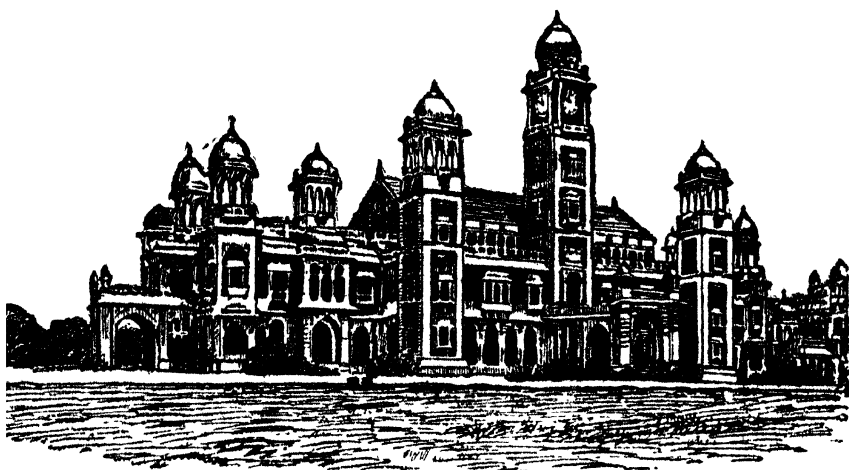


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BIOLOGY SECTION

NEW TREMATODES OF THE FAMILY ECHINOSTOMATIDÆ, POCHE 1925 (PART II) GENUS-PETASIGER

BY

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(Communicated by Dr. D. R. Bhattacharya, Ph.D., D.Sc.)

INTRODUCTION

The genus *Petasiger* was created by Dietz in 1909 to include *P. exaeratus* as the type species. A year later he gave the generic diagnosis together with the detailed account of the species *exaeratus*.

Odhner 1911 included his *Echinostomum variospinosum* under this genus. Since then the following species have been added :—

P. pungens (Syn. *E. pungens* Von Linstow 1893) included by Odhner 1911, *P. neocomense* Fuhrmann 1928, *F. nitidus* Linton 1928, '*P. minutissimis* Gogate 1934, *P. grandivesicularis* Ishii 1935 and *P. lobatus* Yamaguti Japan 1932.

Petasiger yamaguti nov. spec.

Three specimens of this parasite were obtained from the small intestine of an *Ahinga melanogaster*, (Darter)

at Allahabad in January 1940. The worms when living are dirty white in colour and show active lateral movements of the anterior part of the body. They are elongated and broad measuring in whole mounts 2.516 mm. in length and 0.85 mm. in maximum breadth which lies in the region of the acetabulum. The anterior end is tapering and bears a kidney shaped collar studded with 27 large spines of which 19 are arranged in a double uninterrupted row, each measuring 0.08—0.075 mm. \times 0.025—0.0225 mm. The remaining eight spines with curved and blindly pointed tips lie in two ventral end groups of four each, and are 0.1125—0.112 mm. \times 0.0325—0.03 mm. in size. The whole body including the collar is beset with cutaneous spines densely arranged anteriorly measuring 0.015 \times 0.0075 in size.

The almost circular oral sucker lies subterminally at the anterior end with a diameter of 0.153 mm. and an opening of 0.1125 mm. diameter. The pre-pharynx is altogether absent. The muscular and elongated pharynx is 0.187 mm. long and 0.1225 mm. broad. The oesophagus is thin and 0.476 mm. long. It bifurcates into two intestinal caeca at a distance of 0.799 mm. from the anterior end, which terminate blindly 0.136 mm. in front of the hinder end.

The prominent and globular ventral sucker has a diameter of 0.408 mm. Its oblique opening measures 0.204 \times 0.051 in size. It lies in the median line, just above the equatorial region, 0.935 mm. away from the anterior end and 0.153 mm. behind the intestinal bifurcation. The testes are transversely elongated with slightly crenated margins and situated medianly, close behind one another, in the posterior third of the body, 0.442 mm. in front of the hinder end and 1.768 mm. behind the anterior end. The anterior testis is much smaller than the posterior and is more or less dumbbell shaped, measuring 0.425 \times 0.102 in size and 0.085 in breadth in the middle. The posterior

testis is as broad as the anterior one but is longer being 0.187 mm. in length. It is slightly triangular with its smooth apex directed posteriorly.

The cirrus sac lies obliquely between the right intestinal bifurcation and the ventral sucker. It is a well-developed structure with thin walls and measures 0.34×0.17 . It contains a plump, oval, vesicula seminalis, of 0.187×0.153 size, which is filled with sperms and followed by a small pars prostatica and equally small ductus ejaculatorius. The cirrus is long and eversible, when it is not out it lies coiled in the cirrus sac. The genital pore is median and lies immediately behind the intestinal bifurcation.

The ovary is rounded to oval in shape, with entire margins measuring 0.153×0.17 . It lies to the right side, 0.102 mm. away from the margin of that side and 0.561 mm. away from the left margin, 1.53 mm. behind the anterior end and 0.238 mm. behind the ventral sucker. The distance between the ovary and the testes is less than one-third the distance between the ovary and the ventral sucker. The oviduct arises from the left side of the ovary and runs to a small distance where it joins the shell gland complex of 0.306×0.102 size situated between the ovary and the anterior testis.

The uterus is thin and much convoluted lying between the testes and the ventral sucker. Anteriorly it descends along the right side of the ventral sucker to open at the genital pore. The metraterm is not seen. The numerous ova measure 0.085×0.475 in size and are operculated and yellow in colour.

The vitelline follicles are oval in outline and extend from just behind the region of the pharynx upto nearly the hinder end leaving the rhomboidal area of 0.17×0.187 at the posterior extremity. Anterior to the ventral sucker the vitelline follicles overlap the intestinal bifurcation and unite in the median line, but behind it they run

laterally upto the region of the posterior testis slightly overlapping it. They are again united medianly at the hinder end, filling almost the whole of the post-testicular space.

The Y-shaped excretory bladder, as studied in the living condition, consists of a short and slender stem with long and thick cornua. The excretory pore is terminal.

DISCUSSION

This species differs from *P. exaeretus* Dietz, in the shape and position of the cirrus sac and the testes, and in the extent of vitellaria, which in the latter species do not extend in front of the intestinal bifurcation. It differs from *P. pungens* V. Linstow in the number and disposition of the collar spines (19—21 in *pungens*, 27 in the new species) and also in the presence of a neck region.

From the *P. neocomense* Fuhrmann 1928, which it resembles in the number of cephalic spines it can be distinguished by the position of the cirrus (oblique in the new species and straight in longitudinal axis in *neocomense*) and also in the extent of the vitellaria.

From *P. nitidus* Linton, 1928 this species can be distinguished by the number of cephalic spines and the extent of the vitellaria. *P. minutissimus* differs from *P. yamaguti* n. sp. in having 23 cephalic spines as against 27 present in the latter, in the position of the cirrus sac and in the extent of the vitellaria which in *P. minutissimus* stop short of the intestinal bifurcation.

This species, however, comes nearest to *P. lobatus*, Yamaguti from which it can be distinguished in having 27 spines (19 in *lobatus*), in the absence of a pre-pharynx, in having broader anterior end and larger uterus with many convolutions, besides the differences in the shape and disposition of the cirrus sac.

Petasiger antigonus nov. spec.

These parasites were found in the second half of the small intestine of a crane, *Antigone antigone antigone*, shot at Shahjahanpur along with a dozen specimens of *Echinochasmus*.

The body is little elongated, without a neck, and broadest in the acetabular zone with a pointed posterior extremity. The fore-body including the collar upto the region of the acetabulum is closely covered with small spines measuring $0.02-0.015 \times 0.005$ mm. arranged in oblique transverse rows. The parasite is 2.55 mm. in length and 0.799 mm. in maximum breadth.

Anteriorly the body bears a kidney-shaped collar 0.459 mm. broad 0.255 mm. long armed with 27 collar spines with a ventral segregated group of four each. The 19 marginal spines lie in a single dorsally uninterrupted row measuring $0.0725-0.07 \times 0.02$ in size. They are of equal size. The central spines are larger and measure 0.1×0.25 in size.

The almost rounded oral sucker is sub-terminal measuring 0.117 mm. in diameter, overlapped by the dorsal cephalic spines; its opening measures 0.85 mm. in diameter. The narrow pre-pharynx measures 0.119 mm. in length. The pharynx is globular to slightly elongated and 0.14×0.13 in size. The oesophagus is short measuring 0.204 mm. in length. It bifurcates at a distance of 0.68 mm. from the anterior end and about 0.136 mm. in front of the acetabulum into intestinal cæca extending upto the hinder end, terminating on 0.238 mm. in front of it.

The large muscular ventral sucker is slightly elongated and lies medianly in the anterior half of the body. It measures 0.391×0.34 in size. Its centre lies about 0.986 mm. away from the anterior end.

The almost globular ovary, 0.17×0.1675 in size, lies entirely to the right side of the median line between the

acetabulum and the testes. It is nearer the testes than the acetabulum, being 0.136 mm. from the former and 0.221 mm. from the latter. The oviduct arises from the posterior side of the ovary and, after a distance of 0.0375 mm., forms the ootype from where the uterus arises.

The uterus is convoluted and lies between the shell gland complex and acetabulum. Its first few coils form the receptaculum seminis uterinum. The eggs are five in number and yellow in colour measuring $0.085-0.09 \times 0.005-0.0075$ in size.

The transversely elongated testes lie medianly between the centre of the acetabulum and the posterior extremity, close behind each other. The anterior testis is 0.425 mm. long and 0.187 mm. in breadth.

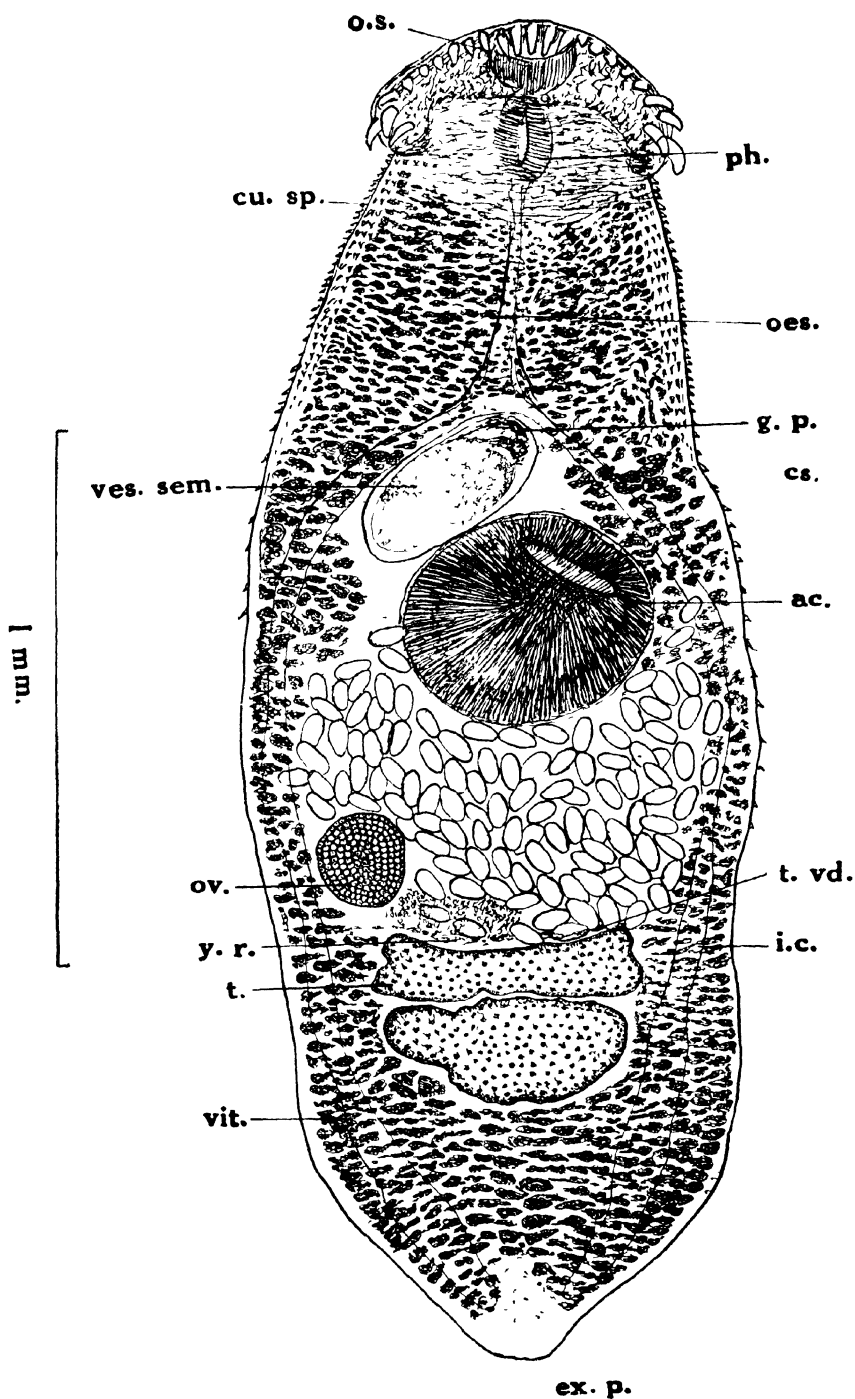
The cirrus sac lies between the acetabulum and the intestinal bifurcation. It consists of a small vesicula seminalis, triangular in shape, measuring 0.17×0.119 mm. and followed by a small ductus ejaculatorius. The pars postatica is not distinguishable. The muscular and ever-sible cirrus is long measuring 0.07 in length.

The vitellaria consist of small oval to squarish follicles commencing just above the intestinal bifurcation, overlapping the latter, and extending nearly upto the hinder end. They run laterally upto the level of the testes overlapping the intestinal cæca but in the post-testicular space the vitellaria of the two sides merge into one another, filling almost the whole of the post testicular space.

The transverse vitelline ducts arise 1.19 mm. in front of the hinder end, i.e., just above the level of the anterior testis and join to form a yolk reservoir in the medium line.

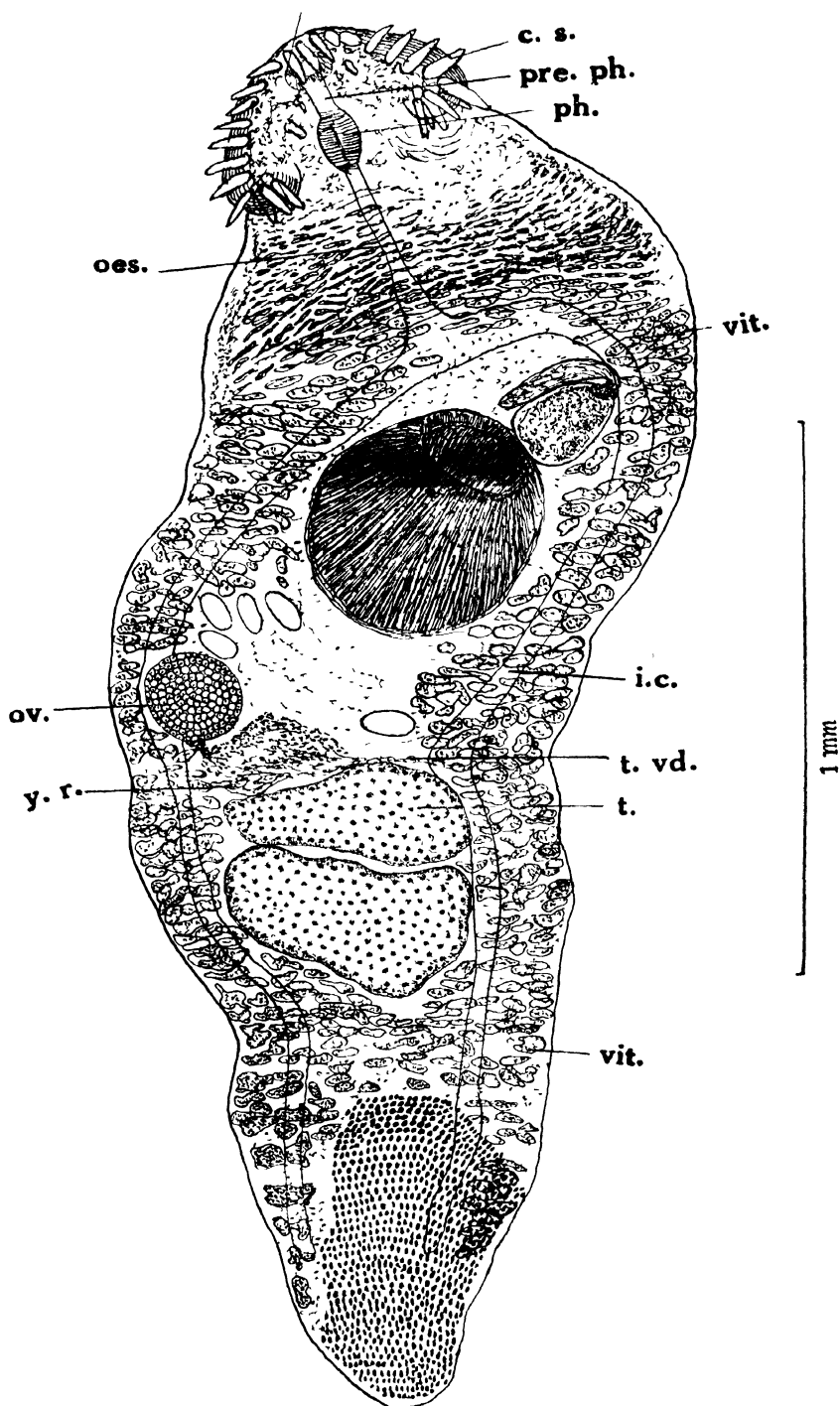
Discussion.

Only a few species of the genus *Petasiger* have been recorded. None of them however, from India. The genotype *P. exaeretus* Dietz 1909 and *P. variospinosus* Odhner 1911 are characterised by possession of 27 collar spines but differ from this new species in having a flask



Petasiger yamaguti (Entire)

ac, acetabulum, cs, cirrus sac, cu sp, cutaneous spines, ex p, excretory pore, g p, genital pore, ic, intestinal caeca, os, oral sucker, oes, oesophagus, ov, ovary, ph, pharynx, t, testes, t vd, transverse vitelline duct; vit, vitellaria, ves sem, vesicula seminalis; yr, yolk reservoir



Petasiger antigonus (Fentre) (Dorsal view)

c s, cirrus sac, i c, intestinal caeca; oes, oesophagus, os, oral sucker, ov, ovary, ph, pharynx, pre ph, pre-pharynx, t. vd, transverse vitelline duct; t, testes, vit, vitellaria, y. r, yolk reservoir

shaped body with a larger neck as also in the shape and disposition of the testes. The ventral sucker in this species is very large.

This specie differs from *P. neocomense* in having thickly arranged vitelline follicles reaching in front of the intestinal bifurcation. From *P. pungens* V Linstow 1893, *P. nitidus* Linton 1928, *P. minutissimus*, Gogate and *P. lobatus* it differs in the different number of cephalic spines, in shape of the body, in the extent of the vitellaria and in the size of the ova.

KEY TO THE SPECIES OF THE GENUS PETASIGER, DIETZ

- | | | | |
|----------------------------------------------------------------------------------------------------------|-----|-----|---------------------------------------|
| Anterior end narrowed in the form of a neck | ... | ... | A |
| Anterior end not narrowed in the form of a neck | ... | ... | B |
| A. Spines 27 in number | ... | 1 | |
| Spines 19 in number | ... | 2 | |
| Spines 23 in number, cirrus pouch rounded; vitellaria uniting in the post-testicular region | ... | | <i>P. minutissimus</i>
Gogate 1934 |
| 1. Cirrus pouch elongated | ... | 3 | |
| Cirrus pouch rounded | ... | | <i>P. exaeretus</i>
Dietz 1909 |
| 3. Cirrus pouch parallel to the axis of the body; vitellaria sparse, lateral, not reaching posterior end | ... | ... | <i>P. neocomense</i>
Fuhrmann 1928 |
| Cirrus pouch oblique, vitellaria unite in the post-testicular space | ... | | <i>P. yamaguti</i> n. sp |
| 2. Cirrus pouch elongated and oblique. Vitellaria united posteriorly, not reaching posterior end | ... | ... | <i>P. nitidus</i> Linton
1928 |
| Cirrus pouch overlapping the ventral sucker. Vitellaria lateral extending to posterior end of the body | ... | ... | <i>P. lobatus</i>
Yamaguti 1934 |

- B. Spines 19—21, cirrus pouch elongated and oblique *P. pungens*
V. Linstow 1893
- Spines 27 in number ... 4
4. Vitellaria commencing from the anterior margin of the acetabulum. Testes smaller than ovary *P. Variospinosum*
Odhner 1911
- Vitellaria commencing in front of the intestinal bifurcation. Testes quadrangular to ovate, transversely elongated *P. antigonus* n. sp

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NEW TREMATODES OF THE FAMILY
ECHINOSTOMATIDÆ, POCHE 1925 (PART III)
GENUS-PATAGIFER

BY

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(Communicated by Dr. D. R. Bhattacharya, Ph.D., D.Sc.)

The genus *Patagifer* was created by Dietz in 1909, to include *Echinostomum bilobum* (Rud). The genus is characterised by the presence of a strongly developed collar, which is divided into lobes separated from one another by deep incision dorsally to the oral sucker, and a broad ventral bay. The body is large and flattened. Dietz also added another species *P. consimilis* in the same year. Since then Johnston Sydney from New South Wales and Yamaguti from Japan have described *P. acuminiatus* John. Sydney 1917, *P. fraternus* John Sydney 1917 and *P. parvispinosus* Yamaguti 1933.

In India only a single species of the genus has been reported so far by Varma 1936 who gave a brief account of *P. wesleyi* without a figure in a preliminary paper. The author is adding the second Indian species to the genus.

Patagifer simarai nov. spec.

Three specimens of this trematode were found in the small intestine of a *Platalea leucordia major*, shot at *Simarai* in the district of Shahjahanpur. The distomes appear opaque in the living condition and are reddish-brown in colour. They are firmly attached to the intestinal wall and show activity by lateral movements of the body. The worms are elongated with greatest width in the region of the collar, measuring 21.386—22.44 mm. in

length and 3.06 mm. in maximum breadth. The collar is broader than the body. Its dorsal incision is not so deep as in the other species and reaches upto the oral sucker, while the ventral angles are widely separated, so that the characteristic bay is represented by the ventral continuation of the collar. There are twenty-seven spines arranged in a single row around the edge of the collar on each side. The dorsal spines are smallest measuring 0.119×0.0275 , in size becoming gradually larger when they pass into the marginal sides. The greatest size of the marginal spine is 0.14×0.0325 . They become smaller towards the ventral angle where the terminal spine of the marginal row measures 0.115×0.0525 . They are all rod shaped with blunt ends and embedded deeply almost along the whole length in the tissue of the collar. On each ventral angle there is a group of finely pointed four spines in two groups of two each overlapping one another.

The body has a deep concavity on the ventral side behind the collar from which projects the proximal ventral sucker. The integument of the body is entirely devoid of spines.

The oral sucker is a little broader than long, muscular, and measures 0.816×0.51 mm. The opening is transversely elongated measuring 0.34×0.085 in size. The pre-pharynx is absent. The oral sucker is followed by a globular pharynx having a diameter of 0.306 mm. The oesophagus is 0.68 mm. long, i.e., it is about twice as long as the pharynx. The oesophagus bifurcates into long intestinal diverticula which run along the margins of the ventral sucker. The intestinal bifurcation lies 1.955 mm. away from the anterior end and 0.595 mm. in front of the ventral sucker. The intestinal cæca have irregular outline and possesses sacculated outgrowths behind the acetabulum, upto the level of the posterior testis, running parallel to the sides of the body, terminating 0.51 mm. in front of the bluntly pointed posterior extremity.

The ventral sucker is large and funnel shaped, measuring 2.04×2.006 in size, with a notch at its posterior margin, and situated 2.55 mm. behind the anterior end. The notch on the hinder margin measures 0.68×0.238 and is the characteristic feature of this species. The acetabular opening is wide and is transversely elongated measuring 1.7 mm. long and 0.935 mm. broad.

The slightly oval ovary lies in the median line in the anterior half of the body, 3.23 mm. behind the ventral sucker and measures 0.544×0.476 in size. The oviduct arises from the posterior side of the ovary and becomes the ootype after a distance of 0.085 mm. where it is surrounded by the shell gland mass situated behind the ovary.

The proximal part of the uterus forms the receptaculum seminis uterinum which lies between the shell gland complex and anterior testis. The many transversely arranged convolutions of the uterus lie between the ovary and acetabulum. Ova are numerous and yellow in colour measuring 0.0975×0.0575 in size.

The testes are longitudinally elongated, nearly equal in size and irregularly ovoid with slightly crenated margins and varying shapes. They lie one behind the other in the median line, in the first part of the posterior half of the body. The anterior testis, 1.615 mm long and 0.731 mm. broad, lies 0.935 mm behind the ovary and 0.323 mm in front of the posterior testis. The posterior testis, 1.683×0.68 mm. lies 7.497 mm. in front of the hinder end.

The cirrus sac, 0.714×0.595 mm. in size, is situated in front of the acetabulum. It contains a bipartite vesicula seminalis consisting of a large triangular posterior part and a short anterior part, a small pars prostatica surrounded by the prostrate gland cells and the short ductus ejaculatorius. The long cirrus of 0.51 mm. in length is armed with small spines and lies coiled when contained within the cirrus sac. The genital pore lies behind the intestinal bifurcation.

The vitellaria are laterally situated and composed of small follicles which are oval in shape extending from a little above the posterior margin of the acetabulum to the hinder end. They lie outside overlapping the cæca.

The excretory bladder is Y-shaped and consists of a main stem with long cornua provided with lateral branches. The main stem bifurcates into cornua a little distance behind the posterior testis.

REMARKS

This species is separated from *P. accuminatus* Johnstone and *P. fraternus* Johnstone, on account of the genital opening being situated behind the intestinal bifurcation.

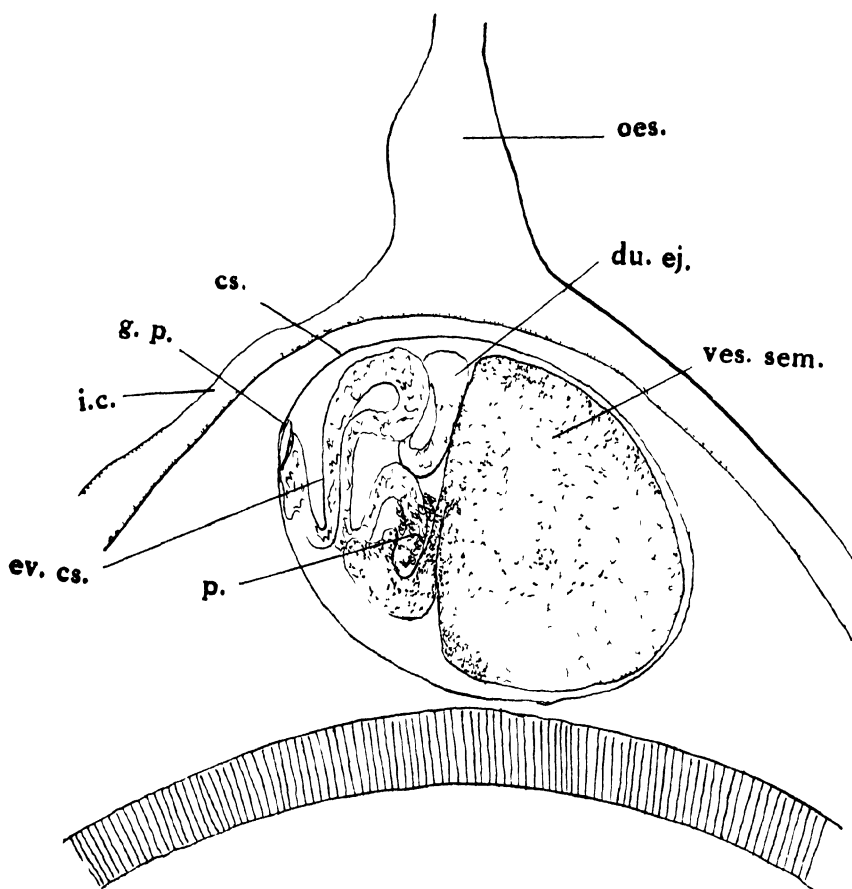
From *P. bilobus* (Rud) it differs in the position of the cirrus sac which lies in front of the acetabulum. It is different from *P. parvispinosus* Yamaguti in the greater width of the collar and also in the cirrus sac not being overlapped by the acetabulum.

From *P. wesleyi* Verma it differs in the lesser number of collar spines, and in the smaller size of its pharynx

This new species also differs remarkably from all the other species of the genus in having a notch in the posterior margin of the acetabulum.

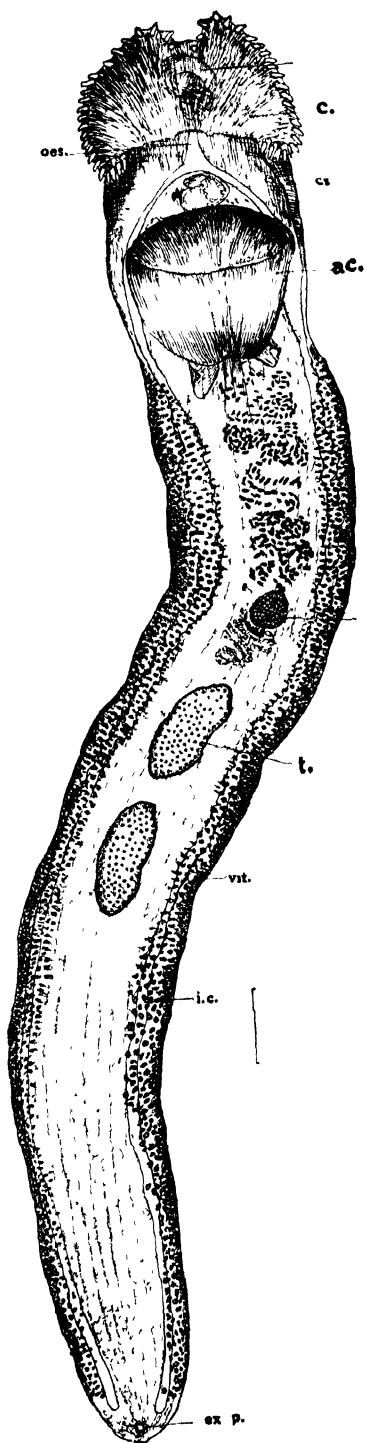
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Patagifer simarai—Portion showing the cirrus sac.

cs, cirrus sac; du. ej, ductus ejaculatorius ; ev.cs, eversible cirrus , g p., genital pore; i. c., intestinal coeca; oes , oesophagus; P, Pars-prostatica; ves. sem., vesicula seminalis.



Patagifer simarae (Entire)

ac, acetabulum, c, cilia, cs, cirrus sac, ex p, excretory pore, oes, oesophagus,

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